# PATENT SPECIFICATION 1,008,223

DRAWINGS ATTACHED.

1,008,223

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## COMPLETE SPECIFICATION.

## Cylindrical Friction Roller for Driving Yarn Bodies on Bobbins, particularly in Vertical Twisting Machines.

We, PALITEX PROJECT-COMPANY, G.m.b.H., a German Company, of Weeserweg 8, Krefeld, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

Cylindrical friction rollers to drive yarn bodies or bobbins in winding machines and/or twisting machines are known in various forms. They all have in common the fact that the surface has a relatively high coefficient of friction in order to grip the yarn. When using existing friction rollers, for instance, to drive conical bobbins, a disadvantage lies in the fact that the roughness created at the surface of the yarn body or bobbin due to the frictional drive, is not uniform and differs, particularly, at the bobbin edges. Endeavours are therefore made to keep the roughening as low as possible. This roughening is mainly due to the irregular structure of the conical yarn body, in consequence of which the point of friction, i.e. the point on the yarn body where the rotary motion is transmitted, by contact by the roller, moves to and fro over the length of the outer surface of the bobbin. This continuous displacement may lead to a roughening effect over the entire bobbin length and may result in considerable variation in the take-off speed.

It is well known that, in order to overcome these difficulties, the axes of the driving shaft and reel or bobbin may be offset in such a manner that almost only a point contact exists between the friction roller and the yarn body or bobbin. This point contact, however, disappears as the yarn body or bobbin builds up. This again is liable to cause a change in the speed of the yarn body or bobbin.



This problem is partly solved by means of a known friction roller consisting of three axial casing sections situated in axial alignment, the outer sections having a low, and the inner one a high coefficient of friction. The inner section may be slightly convex. This roller enables the thread to be wound without any appreciable differences in the point of take-off. The point of contact is thus unable to wander over the entire length of the bobbin and is confined to a small section.

Regardless of the nature of the surface, the existing rollers consist of one or two cylinder bodies which, for instance, engage with each other by means of teeth on the surfaces facing each other and are thus kept interlocked.

The object of the invention is to produce a friction roller the centre section of which has a high coefficient of friction and is slightly convex. This convexity, however, should be adjustable in order to be able to adapt the friction to the actual yarn to be processed. Moreover, the frictional force should be distributed over a greater surface of the yarn body or bobbin and should become effective on a surface which does not wander axially over the yarn body or bobbin. A further object of the invention is to avoid slipping-off of the windings at the bobbin edges so that an improved winding structure is obtained over the entire cross-section and length of the bobbin.

Based on a cylindrical friction roller to drive reels or bobbins in winding and/or twisting frames, the centre section of which consists of a material with a high coefficient of friction and is slightly convex, the inven-

tion provides for two symmetrical individual cylinders which can be adjusted axially in relation to each other and which carry a sleeve between them made of a flexible material, the surface of which constitutes the centre section of the friction roller and which can be made convex on the outside by axially adjusting the two individual cylinders. This enables the convex shape of the centre section to be altered according to the type of yarn to be processed. Furthermore, the surface of the centre section can be pressed against the bobbin in such a manner that the contact surface takes on an elliptical shape and ensures a constant contact between friction roller and bobbin. The friction surface, therefore, is unable to wander to and fro, which would cause irregular winding speeds as well as, in the case of twisting frames, an irregular twist.

Furthermore, the invention provides for the sleeve to be made from a porous, flexible material, the outer face of which has a flexible skin of a high coefficient of friction, which is fitted to a flexible inner sleeve made of a solid, flexible material, such as hard rubber. Whilst the harder, flexible skin, thanks to its high coefficient of friction, ensures that the yarn carrier is gripped, the porous, flexible material allows a corresponding flattening of the sleeve, this giving the contact surface an elliptical shape. The inner sleeve made from a solid, flexible material ensures that the convex shape of the sleeve will remain constant during operation of the roller, the radius of curvature being determined by the axial adjustment of the two individual cylinders. The curvature can thus be adjusted according to the yarn to be processed.

The porous, flexible material may consist of synthetic resin and/or rubber containing a permanently magnetic substance in powder form, e.g. barium ferrite powder. Such a material is available under the trade name of Oxilit LP and Oxilit G, which is magnetic and capable of raising the contact pressure between friction roller and take-up bobbin at the beginning of the take-up provided that the bobbin is carried by a sleeve which is made of steel, or is fitted on a steel core.

In order to ensure that the winding of the reel or bobbin is uniform from edge to edge and, particularly, in order to prevent slipping-off of the winding, the outer surface of the individual cylinders may be formed with thread-like grooves. Since the yarn runs freely between the thread guide and the bobbin and is in contact with the cylindrical surface of the friction roller, these grooves have a certain guiding function and prevent the yarn from slipping off the bobbin edges.

A similar safeguard against slipping-off can also be obtained by forming the surfaces of the individual cylinders with parallel corrugations.

The illustrations show any example of the invention,

Figure 1 represents the cross-section of a friction roller, the centre section of which is in contact with the yarn body or bobbin.

Figure 2 shows in elevation the friction roller of Figure 1 with the individual cylinders having different surfaces.

The friction roller which is in contact with the yarn body or bobbin 1, consists of two individual cylinders 2 and 3 which are alike. They are connected to the driving shaft 4 from which they can be easily removed. The surfaces of the individual cylinders 2 and 3 have shoulders 5 near the middle which serve as thrust abutments for sleeve 6 which is made from a flexible material and is inserted under stress between the two individual cylinders 2 and 3. The curvature of sleeve 6 varies according to the distance between the individual cylinders 2 and 3.

Sleeve 6, made from a flexible, permanently magnetic substance such as Oxilit, consists of a sleeve body 7 made from a porous, flexible material such as, for instance, plastic foam, and is provided on the outside with a harder skin 8 which must have a high coefficient of friction. Sleeve 7 is fitted on top of a thin inner sleeve 9 consisting of a very solid, flexible material such as, for instance, hard rubber. This sleeve 9 ensures that the convex shape determined by the distance between the individual cylinders 2 and 3 remains constant and is maintained throughout the operation of the mechanism.

Sleeve 9 also determines the tension required between the two individual cylinders 2 and 3. Sleeve 7 made from a porous material ensures a flattening in the centre section of the friction roller, so that the contact surface takes on the shape of an ellipse whilst the hard skin grips the yarn body or bobbin.

The distance between the two individual cylinders 2 and 3 is regulated by one or several adjusting screws.

The faces of the two individual cylinders 2 and 3 carry the conical collet 11 which has a number of longitudinal slots. The collet 11 is fitted with an external thread to take a nut 10 which secures the individual sections of the conical collet 11 on shaft 4. This, in conjunction with screw 14, determines the position of the two individual cylinders 2 and 3 on shaft 4. This position, however, is adjustable and enables the curvature of sleeve 6 in the centre section to be altered.

Figure 2 shows the faces of the two individual cylinders 2 and 3, which are situated outside sleeve 6, provided with corrugations. For instance, the face of individual cylinder 2 has a screw-thread groove or corrugation 12 which could also be adapted to cylinder 3.

The latter, however, is shown as being provided with parallel grooves 13 in order to show another type of corrugation. These grooves ensure that the winding structure over the entire length of the yarn body or bobbin remains uniform, particularly also at the edges, and thus slipping-off of the winding at the bobbin edges is avoided.

In the case of existing friction rollers, an axial displacement between friction roller and yarn body or bobbin is often provided so as to create merely a point contact between the two. However, the point contact is lost as the bobbin builds up and the object is only partly achieved. As already stated, thanks to the convex shape of the centre section of the friction roller in accordance with the invention, a contact surface in the shape of an ellipse is obtained which is maintained throughout the entire reeling process and does not wander along the yarn body or bobbin. This results in a constant take-up speed and in a considerable reduction of the roughening effect, so that when using a friction roller in accordance with the invention, a displacement between friction roller and bobbin is almost no longer called for.

WHAT WE CLAIM IS:—

1. A cylindrical friction roller for driving a yarn body or bobbin in a winding machine and/or twisting machine, having a centre section of which is made from a material having a high coefficient of friction, characterised in that the friction roller consists of two symmetrical individual cylinders adjustable axially in relation to each other, which carry between them a sleeve made from a flexible material, the sleeve constituting the centre section of the friction roller and being made more or less convex in axial cross-section by altering the axial position of the two individual cylinders in relation to each other.

2. A friction roller as claimed in claim 1, characterised in that the sleeve comprises three layers, namely a main layer made of porous, resilient material, an outer skin made of a harder flexible material with a high coefficient of friction, and an inner flexible layer also made from a harder material which will ensure that the convex shape of the sleeve will remain constant during the operation of the roller.

3. A friction roller as claimed in claims 1 or 2, characterised in that a synthetic resin and/or rubber containing a permanently magnetic substance in powder form is used for the porous flexible material in the construction of the sleeve.

4. A friction roller as claimed in any one of claims 1, 2 and 3, characterised in that the cylindrical surfaces of the individual cylinders are formed with a screw-thread corrugation.

5. A friction roller as claimed in any one of claims 1, 2 and 3, characterised in that the cylindrical surfaces of the individual cylinders are formed with parallel circumferential grooves.

6. A cylindrical friction roller for driving reels or bobbins in winding machines and/or twisting machines, substantially as herein described with reference to the accompanying drawing.

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1 SHEET This drawing is a reproduction of the Original on a reduced scale

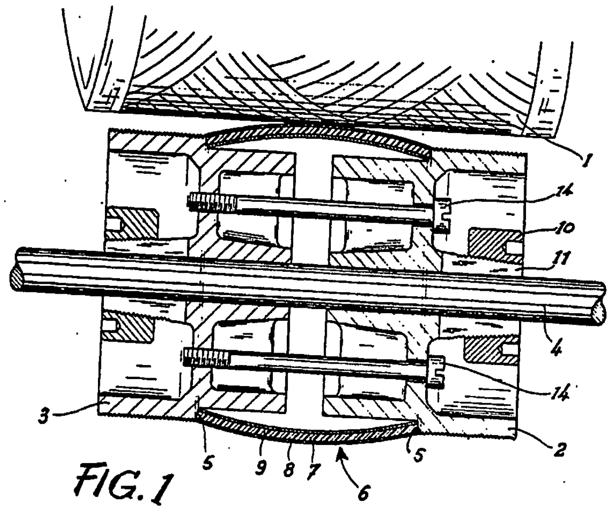


FIG. 1

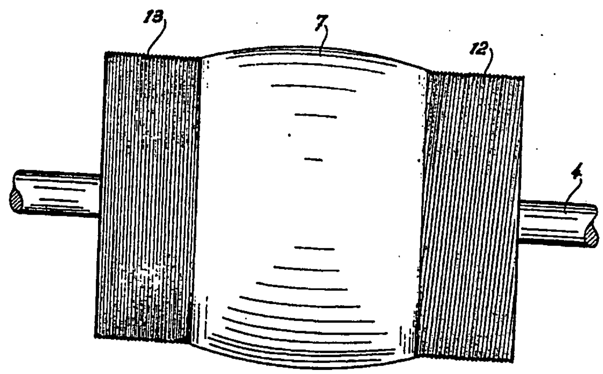


FIG. 2

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